



New Claims

Claims 1 through 33 are cancelled.

Claim 34. (New) An automated system for tracking the movement of multiple objects within a predefined area comprising:

- a first set of cameras forming a fixed area tracking matrix for first detecting the motion of each object in (X, Y) space;
- a first algorithm operated on a computer system responsive to the first set of cameras for determining the (X, Y) location of each object;
- a second set of cameras forming a movable volume tracking matrix responsive to the determined (X, Y) locations from the first algorithm for controllably detecting the motion of each object in (X, Y, Z) space; and
- a second algorithm operated on the computer system responsive to the second set of cameras for determining the (X, Y, Z) dimensional characteristics of each object and for forming a database representative of each object's locations, movements and dimensional characteristics.

Claim 35. (New) The system of claim 34 wherein the combined fields-of-view from all cameras in the first set of cameras form a single contiguous and approximately coplanar field-of-view that is substantially parallel to the ground surface within the tracking area.

Claim 36. (New) The system of claim 35 further comprising:

- one or more energy sources emitting non-visible energy that is detected by both the first set of area tracking cameras and the second set of volume tracking cameras;
- markers adhered onto multiple locations on each object that reflect the non-visible energy; and
- a third algorithm operated on the computer system responsive to the non-visible energy reflected off the markers for forming a database of related coordinates of each marker on each object.

Claim 37. (New) The system of claim 36 wherein the markers are visibly transparent.

Claim 38. (New) The system of claim 37, wherein the objects are additionally identified, further comprising:

at least one uniquely encoded marker adhered onto the top surface of each object that reflects the non-visible energy; and

a forth algorithm operated on the computer system and responsive to the non-visible energy reflected off the encoded markers for including into the database each object's identity along with its related coordinates.

Claim 39. (New) The system of claim 38 wherein the uniquely encoded markers are visibly transparent.

Claim 40. (New) The system of claim 34 further comprising:

one or more energy sources emitting non-visible energy that is detected by both the first set of area tracking cameras and the second set of volume tracking cameras;

markers adhered onto multiple locations on each object that reflect the non-visible energy; and

a third algorithm operated on the computer system responsive to the non-visible energy reflected off the markers for forming a database of related coordinates of each marker on each object.

Claim 41. (New) The system of claim 40 wherein the markers are visibly transparent.

Claim 42. (New) The system of claim 41, wherein the objects are additionally identified, further comprising:

at least one uniquely encoded marker adhered onto the top surface of each object that reflects the non-visible energy; and

a forth algorithm operated on the computer system and responsive to the non-visible energy reflected off the encoded markers for including into the database each object's identity along with its related coordinates.

Claim 43. (New) The system of claim 42 wherein the uniquely encoded markers are visibly transparent.

Claim 44. (New) A method for tracking the movement of multiple whole objects within a predefined area, where each whole object may further comprise connected movable parts that may also be tracked, comprising the steps of:

attaching at least one marker onto each whole object and to each part of each whole object to be tracked;

first detecting and tracking the location of at least one marker, attached to each whole object, in (X, Y) space relative to the surface of object movement;

using the tracked (X, Y) locations of each whole object to direct one or more movable cameras capable of focusing on any and each selected whole object, in order to second detect and track the (X, Y, Z) locations of as many markers as possible on the tracked whole object's attached parts;

forming a database of tracked (X, Y) coordinates for each whole object and (X, Y, Z) coordinates for each marked part of each whole object, the database of which may then be used to determine the continuous location, orientation, acceleration and velocity of each tracked whole object and its parts.

Claim 45. (New) The method of claim 44 wherein the step for first detecting and tracking the location of at least one marker attached to each whole object further comprises:

arranging a first set of cameras into a regular configuration such that their combined fields-of-view form a single contiguous coplanar field-of-view that is substantially parallel to the ground surface within the tracking area, and

using the combined images captured by the first set of cameras to first detect and track at least one marker, attached to each whole object, in (X, Y) space relative to the surface of object movement.

Claim 46. (New) The method of claim 45, wherein the attached markers specifically reflect a narrow band of non-visible energy, further comprising the steps of:

using one or more energy sources to emit throughout the tracking area non-visible energy matching the narrow band specifically reflected by the markers, and

using cameras in both the first fixed set and second movable set that are at least capable of detecting the non-visible energy reflected off the attached markers.

Claim 47. (New) The method of claim 46, wherein the attached markers specifically and only reflect a narrow band of non-visible energy and are therefore substantially transparent to visible energy.

Claim 48. (New) The method of claim 47, wherein at least one marker attached to each whole object is placed to be in consistent view of the first set of fixed cameras and is encoded to uniquely identify that whole object, further comprising the step of:

using the images captured by the first set of cameras to locate the encoded marker on each whole object thereby updating the database of tracked (X, Y) locations for each whole object to include that object's identity.

Claim 49. (New) The method of claim 48, wherein the attached encoded markers specifically and only reflect a narrow band of non-visible energy and are therefore substantially transparent to visible energy.